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"What is the role of semantic maps in cognitive linguistics?"*

Introduction

The purpose of this article is to explore the status and scope of semantic maps. I will address the issue of what role the semantic map model plays: does it have theoretical implications or is it best understood as a tool for typological, diachronic, and pedagogical applications? Furthermore, what are the limits of this model? Are there instances where cross-linguistic data are simply incommensurate, making it impossible (or at least unhelpful) to use this model?

Section 1 will present the issue of polyfunctional grammatical units and their cross-linguistic variation, since it is the existence of such units that has inspired the development of the semantic map model. Section 2 defines the semantic map model and gives examples of existing applications. Section 3 focuses on issues of discreteness vs. continuity (Langacker 2006) in relation to the semantic map model, yielding certain advantages and disadvantages. Section 4 illustrates a selection of linguistic differences that cannot be easily accommodated in semantic maps. Section 5 concludes with a discussion of what it means to compare linguistic functions, and what such comparisons can mean for linguists. The semantic map model is by design relatively discrete, and may be conflating items that cannot be meaningfully compared. Furthermore, it is impossible to be certain that all languages are indeed working with a subset of the "same" parameters, so it may be unwise to base theoretical claims upon such an assumption.

1. Polyfunctional grams and cross-linguistic comparison

All languages have polyfunctional grams that are realized as adpositions and inflectional and derivational morphemes. These grams serve to mark various lin-

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guistic categories such as case, tense and aspect, and these categories are used to express human conceptualization of experiences such as location, time, and relationships among entities. The description of any one such gram in any one language is a difficult task in itself. In cognitive linguistics it has become customary to describe the linguistic category marked by a given gram as a network of submeanings joined by their relationships to both a prototypical member and an abstract schema (cf. descriptions of Slavic aspect and case in Janda 2004, Janda and Clancy 2002, 2006). Thus, for example, the genitive case in Russian and Czech (and probably Polish) can be described as a network of meanings all of which involve a trajectory at or near a landmark.

Another layer of complexity is introduced by the fact that the system of grams within any one language usually entails overlapping functions. In other words, there is not a one-to-one correspondence between grams and the concepts they express. This overlap can occur in various ways, entailing both the presence of more than one marker that may overlap in what meanings they express, and also the presence of various combinations of markers. In Polish, for example, movement toward a location can be coded with two different combinations of prepositions and cases depending upon the nature of the destination, *do* + Genitive (as in *do szkoły* 'to school'), or *na* + Accusative (as in *na plażę* 'to the beach'). We see another kind of overlap in the expression of movement through something, where the same movement in relation to the same landmark can be variously coded using a bare Instrumental (as in *lasem* 'through the woods') or the preposition *przez* + Accusative (as in *przez las* 'through the woods').

This complexity is further compounded when one attempts a comparison among languages, which inevitably reveals different patterns of both polyfunctionality and overlap. To state this more concretely, if we compare the grams used to express destinations across three Slavic languages (cf. Janda 2002), we see that Czech and Polish use *do* + Genitive for expressions that require *v* + Accusative in Russian. However, whereas Czech and Russian use a different combination of grams, namely *k* + Dative, for human destinations, Polish treats human and nonhuman destinations the same way, using *do* + Genitive for both, as in examples (1) and (2). Because Polish, Czech and Russian are closely related, the "same" grams exist in all three languages, but both their range of functions and pattern of overlaps are unique in each language.

1)

Polish:	*Dzieci*	*idą*	*do*	*szkoły.*	[*do* + Genitive]
	Children-NOM	go-3pl	to	school-GEN	
Czech:	*Děti*	*jdou*	*do*	*školy.*	[*do* + Genitive]
	Children-NOM	go-3pl	to	school-GEN	
Russian:	*Deti*	*idut*	*v*	*školu.*	[*v* + Accusative]
	Children-NOM	go-3pl	to	school-ACC	

'The children are going to school.'

2)

Polish:	*Idę*	*do*	*mamy.*		[*do* + Genitive]
	Go-1sg	to	mother-GEN		
Czech:	*Jdu*	*k*	*mámě.*		[*k* + Dative]
	Go-1sg	to	mother-DAT		
Russian:	*Ja*	*idu*	*k*	*mame.*	[*k* + Dative]
	I	go-1sg	to	mother-DAT	

'I am going to my mother.'

Thus the function of Polish *do* + Genitive overlaps with distinctions made in Czech and Russian using three different combinations of markers: *do* + Genitive, *v* + Accusative, *k* + Dative.

The ultimate level of complexity is reached when one attempts similar comparisons across large numbers of unrelated languages, and this is precisely the type of task that has been set for semantic maps.

2. Conceptual spaces and semantic maps

The semantic map model has been proposed to address the problems of polyfunctionality, overlap, and cross-linguistic comparison. Although semantic maps have a variety of versions and authors (including Anderson 1982, Clancy 2006, Kemmer 1993, van der Auwera and Plungjan 1998, van der Auwera, Dobrushina and Goussev 2004, van der Auwera and Malchukov in press, van der Auwera and Temurcu in press), the most prominent work in this area has been done by Haspelmath (2003, 1997a, 1997b) and Croft (2001, 2003; cf. also Croft and Poole forthcoming). Following Croft, I will distinguish between the terms *conceptual space*, which designates the universal backdrop of possible distinctions that human beings can recognize (and might grammaticalise), and *semantic map*, which is a distribution of actual distinctions made by one or a number of languages across the parameters of conceptual space. Croft's distinction is a slight simplification of Haspelmath's (2003: 220) suggestion of three levels: a) conceptual space, b) universal semantic map, and c) language-specific maps of particular grams. For both Croft and Haspelmath a conceptual space serves as a grid, comparable to latitude and longitude, upon which actual functions can be traced on a semantic map, much as the actual features of coastlines and borders are mapped on a globe. In terms of method, however, the researcher proceeds in the opposite direction (cf. Haspelmath 2003: 217), first identifying the polyfunctionality and overlap patterns in individual languages and then arranging those functions so that items subsumed by one gram or involved in overlap are contiguous (cf. Croft 2001: 96; Croft 2003: 134; van der Auwera and Temurcu in press). Recently a mathematical model known as multidimensional scaling has been proposed to

handle the task of finding contiguous arrangements and calculating semantic "distance" for complex data sets (cf. Clancy 2006; Croft and Poole forthcoming). Ultimately the universal semantic map aims to determine which parameters define conceptual space, in other words, what kinds of distinctions human beings can both perceive and code in language.

In addition to determining the parameters of semantic space, it is claimed that a semantic map can contain "a series of implicational universals" (Haspelmath 2003: 230). This means that the semantic map implies that certain functions will co-occur in grams, whereas other combinations of functions will not. Furthermore, a semantic map can serve to visualize the "grammaticalisation paths" (Haspelmath 2003: 236) that take place in the diachronic development of languages.

The main purpose of this article is to explore the theoretical and practical limitations of the semantic map model. In the version presented by Haspelmath (2003) and Croft and Poole (forthcoming) the semantic map model makes a very strong theoretical presumption: it presumes that all human languages are working with the same parameters, and merely choosing various subsets of those parameters for grammaticalization. Thus the semantic map model has the status of a heuristic for discovering the parameters of human conceptualization.

Before raising any questions about the semantic map model, let's work through an example.

2.1. Haspelmath's temporal locations

Haspelmath 1997b is a rich and insightful study of various ways in which languages of the world implement the TIME IS SPACE metaphor. This book compares data across fifty-three languages representing nineteen genetically unrelated language families and presents some striking patterns. One of the most robust and intricate patterns involves what Haspelmath terms "simultaneous temporal location", basically "time when" expressions that use various time periods as landmarks. Figure 1 presents a map of these simultaneous temporal locations, based on the data of the fifty-three languages in Haspelmath's study. In other words, the map displays the sum of contiguity relationships observed in the study. With the exception of one language, Ngore-Kiga, for which Haspelmath did not have reliable data, all languages observed the same overall set of contiguity relationships.

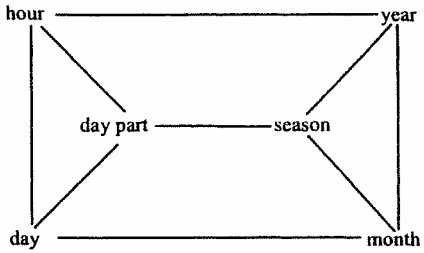

Figure 1. Semantic map of simultaneous temporal location (adapted from Haspelmath 1997b: 106)

In the map, semantic distance is iconically represented by physical distance and only items that are connected by lines can be coded with the same grams. So the map asserts, for example, that temporal locations referring to year and day are unlikely to be marked with the same gram, and that this is possible only if the gram also overlaps with intervening items following the marked lines. In other words, if one gram covers both year and month, it might also cover day too. But one wouldn't expect to find a language that has one maker for day, day part, and year, but another marker for month, season, and hour.

For the purpose of our discussion, let's illustrate the function of Haspelmath's semantic map using data from English and Polish.

Table 1. English and Polish data for simultaneous temporal location

Function	English example	English preposition	Polish example	Polish preposition	Polish case
hour	*at six o'clock*	*at*	*o szóstej*	*o*	Locative
day part	*in the night*	*in*	*w nocy/nocą*	*w/Ø*	Locative/ Instrumental
day	*on Saturday/ on the first of August*	*on*	*w sobotę/ pierwszego sierpnia*	*w/Ø*	Accusative/ Genitive
month	*in November*	*in*	*w listopadzie*	*w*	Locative
season	*in the summer*	*in*	*w lecie/ latem*	*w/Ø*	Locative/ Instrumental
year	*in the year 2006*	*in*	*w roku 2006*	*w*	Locative

The English data is easiest to read. Whereas *at* and *on* each occupy one corner of the semantic map, *in* covers all the rest, and all of those uses are contiguous to each other. Polish is a bit more complicated because it uses both prepositions and cases to do this job. Let's start with prepositions: *o* sits in the same corner as Eng-

lish *at*, and *w* can be used with all other time periods, yielding a contiguous pattern. The use of no preposition (Ø) also occupies the contiguous region of day, day part, and season. The cases are likewise well-behaved according to the map. The Genitive and Accusative cases are restricted to one corner. The Instrumental case can appear with day part and season, which are contiguous. And the Locative case can appear with all of the remaining items, tracing the lines that rim the semantic map. In other words, if you draw loops around all the items that have the same marker in English or Polish, you will always get a contiguous space on the map. And although I won't go into the data here, Haspelmath's semantic map does indeed hold up to data from languages that were not in his study, such as Czech and Norwegian.

Having a clear, robust semantic map of this type may give us some satisfaction in knowing that there are typological patterns. But we also have to ask: what does this map mean? It is nice to see that larger time periods (month and year) are closely connected, as are shorter ones (hour and day), and that parts are closely connected to their wholes (hour and day part connected to day and month and season to year), but beyond this it is hard to find any profound revelation here. The explanatory value of such a map seems shallow.

A more complex map of Slavic case and preposition usage, targeting specifically coding of destinations, locations, and sources has been presented in Clancy 2006, using multi-dimensional scaling techniques. These techniques have been used both to verify some earlier maps, such as Haspelmath's (1997a) map of indefinite pronouns, verified by Croft and Poole (forthcoming), and to create new maps from existing data, as in the case of spatial adpositions collected by Levinson et al. (2003) and Dahl's (1985) aspectual markers, also both mapped by Croft and Poole (forthcoming). Less computationally-oriented semantic maps have involved voice phenomena (Kemmer 1993, Croft 2001), modals (van der Auwera and Plungjan 1998), imperatives (van der Auwera and Dobrushina and Goussev 2004), and adjectivals (van der Auwera and Malchukov in press). As van der Auwera and Temurcu (in press) point out, semantic maps can also be viewed as a modern incarnation of an old idea, similar to classical geometric representations such as the "Aristotelian square".

In Janda (forthcoming) I have proposed a semantic map for Russian aspect, but I have also called into question the use of the semantic map model by pointing out that the model may have some serious limitations. The next section will raise quantitative issues associated with the semantic map model that indicate certain advantages and disadvantages this model presents.

3. The discreteness of semantic maps

I would like to frame this discussion of semantic maps in terms of Langacker's (2006) concerns about continuity and discreteness in linguistic models. As Langacker points out, all models are metaphorical, and all metaphors are potentially misleading, particularly if one forgets that the metaphor may be suppressing some information, and/or if the metaphor is excessively discrete or continuous. Most phenomena, including linguistic phenomena, are complex enough to justify applying both discrete and continuous models in their interpretation (Langacker 2006: 107). Imposing discreteness on a system means that grouping and reification facilitate the identification of units that would not be available in a continuous description, such as galaxies, archipelagos, villages, and discrete (yet related) languages. Continuity has the advantage of facilitating focus on the relationships among parts of a system, making it possible to identify fields of similarity that discreteness ignores, such as dialect continua and all manner of gradients. We have the option of choosing various models, some of which will be relatively discrete and some of which will be relatively continuous.

In general it seems that linguistic theories tend to err on the side of choosing models that impose excessive discreteness on phenomena. Formalist approaches are discrete to an extreme degree, treating all of language as a machine that manipulates discrete objects. Functionalist approaches do not reach as far in the opposite direction, but tend to be more continuous on the whole. For example, the network model (referred to in section 1 above) is relatively continuous in that it identifies relationships among the submeanings of a gram and allows for schematization of the entire network. But at the same time the network model has been rightly criticized for being too discrete in the identification of submeanings and thus failing to sufficiently facilitate understanding of the continuous dispersal of phenomena.

Langacker (2006: 146) accepts this criticism, yet defends the network model on the grounds that any metaphor can be misleading, and that "a misleading metaphor does not prevent insightful description so long as one is fully aware of its limitations". He also offers an alternative that is better balanced in terms of discrete vs. continuous, namely a mountain range, where you have both the discrete peaks and a continuous field of altitude values connecting those peaks via intervening valleys. But even this model has limitations, since it causes us to lose some of the information captured by the network model, which shows which meanings are extensions of others (Langacker 2006: 147).

As I will argue below, the semantic map model is relatively discrete and thus subject to as many (probably more) caveats as the network model. The discreteness of the semantic map model doesn't negate its advantages, but it does require us to recognize the model's limitations and apply the model with caution.

3.1. Advantages of discreteness

There are several advantages of the semantic map model. At the level of a given language a semantic map makes it is possible to see how individual grams overlap

in their functions in a given domain. At the level of linguistic typology, a semantic map may reveal patterns of association that could not otherwise be discovered, such as those for the simultaneous temporal locations described in section 2. A semantic map is an effective way to visualize messy empirical data, and it is possible to design a set of operational instructions for investigating the semantic maps of given domains (as we see in Croft and Poole forthcoming). As Haspelmath (2003: 213) points out, semantic maps are both more coherent than mere lists of submeanings, and more detailed than the positing of abstract general meanings. Furthermore, a semantic map may provide insights on the direction of diachronic development. Most of these advantages are precisely the advantages that we would expect to find in a model that is relatively discrete.

3.2. Limitations of discreteness

Discreteness can also be the source of limitations for a model, and the semantic map model is not immune. Indeed, semantic maps are arguably more discrete than the network model, itself targeted above as possibly overly discrete. Even within a given language, a semantic map takes parts or wholes of several networks and makes generalizations across them, focusing only on their "discrete" submeanings. When used cross-linguistically this effect is further amplified, since much of the continuous detail of specific grams and languages is necessarily flattened out.

Langacker's "mountain range" metaphor for semantic networks can help to illustrate the discretising effect of semantic maps. Let's imagine that a given gram is indeed a mountain range, and that all grams are mountain ranges with varying shapes. What the semantic map does is to take only the peaks from a variety of mountain ranges and compare their relative distance. It doesn't compute all the topographical information in between. This flattening of data happens, of necessity, at two successive levels, both that of a language (generalizing across grams), and that of typology (generalizing across languages). Thus one could assert that the semantic map model is potentially two orders of magnitude more discrete than the semantic network model.

To return to our English vs. Polish time expressions above, the semantic map can't do full justice to the differences in extension of given grams. For example, according to the semantic map, both English and Polish are behaving in the "same" way and using the "same" markers to cover the contiguous regions of month and year: English uses *in* and Polish uses *w* + Locative for both of these temporal locations. However, the overall extensions of English *in* and Polish *w* are not the same, as even this tiny sample shows. The schema and prototypes of English *in* and Polish *w* are necessarily somewhat different, which means that the meanings of these prepositions are not exactly the same. But in the semantic map model it is asserted that they are expressing the "same" meaning in regards to these temporal locations. A certain amount of detail has thus inevitably been suppressed. In a continuous model it would make sense to wonder whether English *in* and Polish *w* are every really expressing the "same" relationship, since each preposition carries along the semantic baggage of a different set of extensions, but the discreteness of a semantic map eliminates this question.

As Langacker (pc, April 2006) has pointed out, the semantic map model has further characteristics that impose discreteness. For example, the semantic map merely computes distance and contiguity for various parameters. Thus it never examines the inherent semantic values of a given gram, but instead aims only for the differences between grams. In other words, semantic maps focus exclusively on external quantitative differences at the expense of positive qualitative properties. The conclusion to be drawn from this line of reasoning is that the semantic map is capable of committing the same errors as structuralism, in which description is reduced to discrete features based only on how values differ from each other.

The discreteness issues raised above do not indicate that the semantic map model is hopelessly flawed or that it should not be pursued. These issues merely remind us that we are dealing with a model that is relatively discrete, and that its ability to fully represent the continuous aspects of linguistic meaning are limited. As functionalists and cognitive linguists, we need to be aware of these limitations.

In addition to the quantitative measure of a model as discrete vs. continuous, there are important qualitative considerations that need to be examined, namely whether the parameters that are being compared are indeed comparable.

4. Phenomena that may elude semantic maps

If two (or more) sets of data are qualitatively different, does it make sense to calculate relationships between them? What if the data sets are just incommensurate? The semantic map model assumes that all linguistically expressible meanings are part of a single conceptual space from which different languages make different choices. But we don't (and perhaps can't) know for sure that this is a fact. Some phenomena indicate that different languages may just be doing things differently, in ways that defy meaningful comparison. These phenomena involve irreconcilable differences in the parameters expressed, in the means used for their expression, and in the metaphors used to conceptualize linguistic categories.

4.1. Different parameters

One possibility is that two or more languages might use entirely different parameters to encode the same domain of human experience. If one language uses one set of parameters and another language uses an entirely different set of parameters, do the parameters even belong on the same map?

The extreme case is where one language has a distinction (or a system of distinctions) that another language lacks entirely. As Lehečková (2003) has shown, Finnish is utterly devoid of grammatical gender distinctions (even the 3sg personal pronoun is genderless), whereas Slavic languages such as Czech and Russian obligatorily mark gender in association with over a dozen grammatical environments. I have furthermore shown that masculine gender in Slavic (and particularly in Polish) is richly articulated with further subdistinctions such as virility, animacy, and count vs. mass (Janda 1996, 1999). Would it make sense to assert that Finnish and Polish simply have radically different distributions of gender distinctions, given that there is no overlap whatsoever? Do they belong on the same map at all? Or would it be more fruitful to say that Finnish has a completely flat gender landscape, whereas the gender map of Polish is very complicated?

This picture gets more complicated when we compare systems that have entirely different parameters. For example, there are some languages like Tzeltal that use only cardinal directions ('east', 'west', etc.) even for locating relatively small items and lack any terms for 'left' vs. 'right' (Majid et al. 2004). English, on the other hand, makes nearly exclusive use of *left* vs. *right* for such objects; though the cardinal direction terms exist, they can't be used in such situations. Languages using cardinal directions are using geography as the source domain for such locational terms, whereas languages like English are using the human body as their source domain. The two sets of parameters simply don't overlap. It is impossible to create a physical map that would represent both the cardinal directions and left vs. right at the same time, because one set of parameters is fixed, and the other is shiftable. If one could force both types of dimensions into the same model, would it make any sense to do so?

Let's take an even more complicated set of differences. For example, in English concepts like containment and support play an important role, yielding distinctions like *in* vs. *on*. In Korean many similar locations are sorted according to tight vs. loose fit (Bowerman and Choi 2003). Casad's work on Cora locationals (1988) presents a system motivated by the topography of mountain slopes, where the relevant parameters include convex vs. concave and facing vs. occluded slopes. We can add to this a language like Chalcatongo Mixtec (Brugman 1983) which derives locational terms from body parts. Space precludes detailed analysis of these different systems and all the parameters they entail. However, this list should suffice to raise the point that different languages might be using wholly different systems of distinctions to describe the same range of human experience. If different speech communities share no parameters, does it make any sense to juxtapose the sum total of parameters in a single map? Mathematical tools may make this possible, but they do so at the cost of ignoring significant differences between the languages. In other words, say I show people an apple in a bowl and get the following responses: a speaker of language A says 'the apple is contained-bowl', a speaker of language B says 'the apple is loose-fit-bowl', a speaker of language C says 'the apple is concave-valley-facing-bowl', and a speaker of language D says 'the apple is belly-bowl'. They are all describing the same reality. But they are not all describing the same conceptualization of reality. Does it make sense to collapse all of these different conceptualizations into a single conceptual space? If you do so, is the result really "conceptual" space at all?

Croft and Poole (forthcoming) have created such a space based on data from Levinson et al. (2003), in which data points prompted by 71 pictures of spatial locations were collected from nine different languages. This space is not designed to capture any differences in the underlying parameters, merely to show what items cluster together. Levinson et al. (2003: 514) specifically rejected the idea that the foci of uses they found represented innate universal categories, and pointed out that different speech communities might indeed have significantly different ways of organizing spatial concepts. In other words, Levinson et al. (2003) are cautious and recognize that their model is merely a tool that may both reveal and hide information. Croft and Poole (forthcoming: 24) have applied more sophisticated techniques to this data, largely confirming Levinson et al.'s results, but they assert that their model provides a tool for "deriving language universals".

4.2. Different means

A slightly different kind of problem emerges when different languages differ in how they represent the "same" information. The maximal distinction is perhaps where one language has grammaticalised a distinction that another language represents only optionally in the lexicon, as is often the case with evidentiality (cf. Clancy pc April 2006). Macedonian and Albanian mark evidentiality in their verb systems (Friedman 2003), whereas English and Polish make at most marginal use of lexical items such as *allegedly* and *rzekomo* to achieve some similar goals. If something is clearly a regular part of the grammatical system in one language, but merely lexical (and optional) in another, how can that difference be represented in a semantic map? And is such a representation meaningful?

A more complicated version of this question is posed by the famous distinction between verb-framed and satellite-framed languages (Talmy 1985). This distinction involves the distribution of labour between verbs and various "satellites" (prefixes, particles, adverbials, etc.) in expressing manner and path of motion. Verb-framed languages use verbs to express the path of motion and satellites to express the manner of motion. Satellite-framed languages, by contrast, use verbs to describe the manner of motion and mark the path with satellites. Spanish is a verb-framed language, as we see in the phrase *entró corriendo* '(he) ran in', which could be rendered more literally as 'he entered running', where the verb expresses the path, followed by an adverbial gerund which provides us with the manner. Like English, Polish is a satellite-framed language, and would render this situation as *wbiegał* '(he) ran in', where the prefix *w-* is a satellite expressing the

path and the verb designates the manner. Both types of language can provide both types of information, but the status of that information is different. For the verb-framed languages, the path is more important than the manner, which can be left unexpressed. In strongly satellite-framed languages like Polish, the speaker is forced to designate the manner, but the choice of whether to identify a path is secondary. When you ask a speaker of a verb-framed language what someone was doing, they are more likely to name a path than a manner, and the reverse is true for speakers of satellite-framed languages (Malt, Sloman and Gennari 2003). In a semantic map model both the fact of the difference and the opposed hierarchies involved of necessity disappear. If a verb-framed and a satellite-framed language make all the "same" distinctions, they are for this type of model indistinguishable. However irreconcilable this difference may appear, it simply disappears in a semantic map.

4.3. Different metaphors

To some degree this difference overlaps with the different parameters explored in 4.1, because all linguistic categories can involve metaphorical extension and construal. In 4.1 I presented four different systems for organizing concepts of location, based on four metaphors, with four entirely different source domains: containment, fit, topography, and the human body. Through that example we have already examined some striking differences attributable to metaphor. In this section I will explore a more subtle kind of difference in metaphor involving a more abstract target domain where construal plays a more prominent role.

I will illustrate this discussion with the system of metaphors that motivate Russian aspect, with an eye to how and whether they could be compared with the metaphors that motivate aspect in other languages. This illustration is based upon data and analysis in Janda 2004, Janda forthcoming, and Janda in progress.

The TIME IS SPACE metaphor is extremely pervasive, possibly universal in languages of the world. There is strong evidence for this metaphor in all of the languages in Haspelmath's (1997b) study. There is just as strong evidence in the same study that no two languages realize this metaphor in the same way. This can involve fairly trivial differences in what is mapped from the source domain to the target domain, or in other words, what possible mappings have been either conventionalized or ignored. For example, it appears that many languages conceive of time as a line in which earlier events are metaphorically 'in front of' later events (as in English *before*). Given this metaphorical arrangement, later events are also necessarily 'behind' earlier events, and logic dictates that the same languages should also use 'behind' to mean 'after'. But the data are strongly imbalanced (Haspelmath 1997b: 56–57). Many languages use 'in front of' to code 'before', but don't use 'behind' for 'after', and the opposite coding, where 'behind' = 'after' in the absence of 'in front of' = 'before' is quite rare. In other words, even

when you have the "same" metaphor, languages can differ in which entailments are conventionalized and which ones are ignored.

Aspect is a more subtle and complex category, though it is also likely subsumed by the TIME IS SPACE metaphor in most, if not all languages. Furthermore, aspect is less anchored to objective reality because the "same" event can be variously construed even by the same speaker, depending upon what they want to convey about that event and how it relates to other events, yielding different values for aspect.

The Russian aspectual system is typologically unusual (Dahl 1985: 21, 27, 69, 70, 80, 84–86, 189) in that a) Perfective vs. Imperfective is obligatorily coded in all verbal forms (yielding entire verb paradigms that are either Perfective or Imperfective), and b) the markedness relationships observed in most languages, where Imperfective is the marked value, are reversed in Russian, where Perfective is the marked value. This results in a complex system where any given item in the verbal lexicon is usually represented by a cluster of two or more aspectually related verbs. Perfective will be marked with superscript "p" and Imperfective with superscript "i".

Aspect in Russian is motivated by three different metaphors, each of which is a more specific version of TIME IS SPACE. These three metaphors interact to yield a system that distinctively marks one type of Imperfective and four types of Perfective verbs. The metaphors also motivate a hierarchy that determines the possible combinations of Imperfective and Perfective. The metaphors map the following source domains to relevant characteristics of events: 1) Solid Object vs. Spreadable Substance => Perfective vs. Imperfective, 2) Travel vs. Motion => Completable vs. Non-Completable, 3) Granular vs. Continuous => Singularizable vs. Non-Singularizable. The four types of Perfectives are: Natural Perfective, Specialized Perfective, Complex Act Perfective, and Single Act Perfective.

1) Solid Object vs. Spreadable Substance = Perfective vs. Imperfective. Over a dozen properties of physical matter motivate the choice of a Perfective vs. an Imperfective verb. An event described by a Perfective verb like *napisat*^{p} 'write (a complete document)' is one that has a definite shape, clear boundaries, and is unique and countable like a Solid Object, whereas an Imperfective event like *pisat*^{i} 'write, be engaged in writing' lacks shape, boundaries, and behaves like a mass. The isomorphism between matter and Perfective vs. Imperfective in Russian is explored in detail in Janda 2004. The "same" event can often be construed as either Perfective (like a Solid Object) or Imperfective (like a Spreadable Substance), depending on whether the speaker wants to affirm vs. categorically negate an event, describe how an event unfolded or not, foreground vs. background an event, or be aggressive as opposed to polite.

2) Travel vs. Motion = Completable vs. Non-Completable. Some situations, such as writing an article, are like traveling to a destination because you begin at a departure point (the first page) and you keep writing until you reach the arrival

point (the last page). Other situations are more like Brownian motion, which involves moving without going anywhere. Working at a 9-to-5 job is like undirected motion because you don't finish with a result, you just stop doing it when you reach 5 o'clock. Completable vs. Non-Completable is a parameter that is partially subject to construal. Russian *krepnut*^{ij} 'get stronger' is unambiguously Completable, since you can't do any of it without heading for a result. *Stonat*^{ij} 'moan' is unambiguously Non-Completable, since this kind of activity can't lead anywhere. *Pisat*^{ij} 'write' is ambiguous because it can be construed as both Completable in *Professor pišet*^{j} *stat'ju* 'The professor is writing an article', and as Non-Completable in a generalized job description, as in *Professora pišut*^{i} *stat'ji* 'Professors write articles'. *Rabotat*^{ij} 'work' is unambiguously Non-Completable, but if we use a lexical prefix to add some specific contours, a specialized version of this situation can be Completable, as in *pererabotat*^{p} 'revise (literally, re-work)'. These various construals determine what kinds of Perfectives can be associated with a given Imperfective. Any verb that is construable as Completable can have a Natural Perfective which shares the same lexical meaning with the corresponding Imperfective, as in *okrepnut*^{p}, which is the Natural Perfective of *krepnut*^{ij} 'get stronger', and *napisat*^{p}, which is the Natural Perfective of *pisat*^{ij} 'write'. Only verbs that are construable as Non-Completable will have one or more Complex Act Perfectives (a.k.a. Aktionsarten), termed thus because they combine an activity with one or more boundaries, as we see in *po-* prefixed delimitative verbs that mean 'do X for a while'. This motivates the existence of Complex Acts such as *popisat*^{p} 'write for a while', *porabotat*^{p} 'work for a while', and *postonat*^{p} 'moan for a while'. Verbs that describe actions that can be Completable if given specific contours can form Specialized Perfectives, as we see in *perepisat*^{p} 'rewrite' *pererabotat*^{p} 'revise'.

3) Granular vs. Continuous = Singularizable vs. Non-Singularizable. This metaphor applies only to verbal actions that can be construed as Non-Completable. Non-Completable actions can be either Granular like sand in that they are composed of identical discrete bits, as in *ščipat*^{ij} 'pinch', which is composed of many individual "pinches", or Continuous, as in *rabotat*^{ij} 'work', which is construed more like water. Only actions that are construed as Granular can be associated with Single Act Perfective verbs, such as *ščipnut*^{p} 'pinch (once)', which plucks out a single "pinch".

The combined effects of these three metaphors yield an implicational hierarchy that predicts all and only those clusters of aspectually related verbs that are actually attested in Russian (see Janda forthcoming for more detail):

Activity > (Natural Perfective/Specialized Perfective) > Complex Act > Single Act.

I have sketched out only the barest outlines of a complicated system in which metaphor and construal play major roles. What would happen if we tried to compare this system to the aspectual system of other languages? Inevitably we would find that there are differences in both the metaphorical structure and the role of construal. Some languages might interpret Perfective vs. Imperfective aspect as merely Count vs. Mass (cf. Langacker 1987a), but as I have argued in detail (Janda 2004), while the Russian Perfective vs. Imperfective distinction includes Count vs. Mass, it is considerably more complex. Thus the Russian aspectual system would be subtly different from a system where Count vs. Mass was the only source domain. But even if you have the "same" metaphor, it can be realized differently in different languages, with different mappings being either conventionalized or ignored, as we saw in the languages above that shared the timeline metaphor of sequenced events 'in front of' and 'behind' each other, but utilized different entailments of the metaphor. And what if a language simply used a different metaphor to motivate Perfective vs. Imperfective? For example, it would certainly be possible to use Shut vs. Open as a source domain for Perfective vs. Imperfective, and this may be what is happening in languages like French. It is more difficult to pinpoint the source domains for a very abstract category like aspect than for spatial location, as in 4.1. But this does not preclude the possibility that the underlying metaphors could be significantly different. And even if the metaphors are only subtly different, what does this mean for making "comparisons"?

We don't have to speculate on the outcome of making a semantic map of aspect because Croft and Poole (forthcoming) have undertaken this task using Dahl's (1985) database of responses from 64 languages concerning the use of verb forms in 250 sentence contexts. While the patterns involved are valuable and mostly confirm Dahl's analysis, they of necessity eliminate all language-specific detail such as that outlined for Russian above. The question of whether clustered data points really represent a shared parameter or not is not addressed.

5. The meaning of comparison and theoretical implications

Some proponents of semantic maps (especially Croft, Poole and Haspelmath) make strong claims, such as that: a) there exists a universal conceptual space, and b) the grammar of a given language is the sum of the "lines" drawn by that language across this single shared space.

I would urge caution because I see no reason why we must assume that everyone in the world is dealing with the same conceptual space. We have no way to prove or to disprove this claim, so it would be dangerous to base a linguistic theory on such an assumption. Doing so puts us at risk of distorting facts. At the very least, an ambitiously discrete theory of this type suppresses a great deal of significant information. And the results of semantic maps don't as a rule yield profound surprises in, as we saw in 2.1.

A cross-linguistic semantic map necessarily smoothes over some of the complexity of any given language, reducing it to the presence vs. absence of a given function. This present-vs.-absent tracking of data, even though it is certainly more sophisticated in seeking contiguity patterns, is nevertheless reminiscent of the discreteness of structuralist distinctive features. While semantic maps can be valuable for visualizing patterns that might otherwise go unrecognized, they do so at the expense of capturing detail, such as differences in metaphor, construal, and scalability, all of which are key to a cognitive linguistic analysis (cf. Lakoff and Johnson 1999; Langacker 1987b, 1991a, 1991b). More crucially, what can a semantic map tell us if two (or more) languages grammaticalise parameters that are partially or completely incommensurate? Can one even say that these languages (and their speakers) are even working with the same conceptual space? It might be possible (mathematically) to construct a space that would accommodate sets of incommensurate parameters, but is it meaningful to do so? A more subtle version of this question arises when the same or similar parameters interact differently in different languages – again, in this situation it probably doesn't make sense to force all these facts into a single semantic map. To restate one of our examples above, how do we know that the Finns and the Poles inhabit the same conceptual space for gender? It seems that the Finns are gliding freely over an open surface like that of their many lakes, whereas the Poles are navigating a complex terrain filled with various barriers, more reminiscent of Silesia, so why can't we assume that they really are inhabiting different conceptual places? I am of course NOT claiming that geography makes any predictions about the complexity of conceptual space; that would be silly. But if language A is making its distinctions in terms of containment, B is concerned with loose vs. tight fit, C is mapping geographic features, and D is working with body parts, are they really in the same place at all? It might be worthwhile finding out whether there are some tendencies that cut across all these methods for locating objects, but we can do that without assuming that they are all in the same conceptual space.

I like semantic maps. I find some of them fascinating and useful. I have used them myself and find them valuable for visualizing complex information, both as a linguist and as a language teacher. Some semantic maps seem to be both fairly detailed and fairly robust across large numbers of languages (such as Haspelmath's maps for temporal locations and indefinite pronouns), and they may give us information about the diachronic development of grammaticalisation. However, all cross-linguistic maps have the potential to suppress detail to the extent that it can be hard to say what we are really comparing. It might be safest to use semantic maps with regard to individual languages or groups of closely related languages (cf. Clancy 2006), since then we reduce the chances of comparing things that are actually incommensurate. For larger typological purposes semantic maps may yield interesting patterns (as in Levinson et al. 2003), which are valuable as long as we remember that they have imposed discreteness on phenomena

that are continuous and possibly conflated items that simply belong to different planes.

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